NSTX-U

Supported by

U.S. DEPARTMENT OF ENERGY | Office of Science

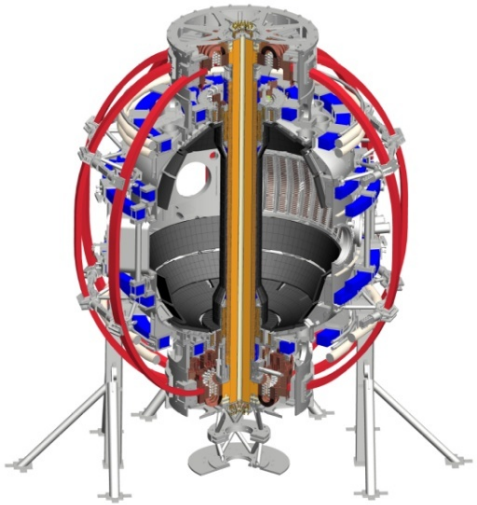
NSTX-U Collaboration Plans for UCLA

PI: Neal A. Crocker
Co-PI: Prof. Troy Carter
Grad. Student (planned 2nd year onward)

UCLA

PPPL Research Contacts and Collaborators:
E. Belova, N. Gorelenkov & W. Guttenfelder

NSTX-U Collaborator Research Plan Meetings
PPPL – LSB B318
April / May 2014



Coll of Wm & Mary
Columbia U
CompX
General Atomics
FIU
INL
Johns Hopkins U
LANL
LLNL
Lodestar
MIT
Lehigh U
Nova Photonics
ORNL
PPPL
Princeton U
Purdue U
SNL
Think Tank, Inc.
UC Davis
UC Irvine
UCLA
UCSD
U Colorado
U Illinois
U Maryland
U Rochester
U Tennessee
U Tulsa
U Washington
U Wisconsin
X Science LLC

Culham Sci Ctr
York U
Chubu U
Fukui U
Hiroshima U
Hyogo U
Kyoto U
Kyushu U
Kyushu Tokai U
NIFS
Niigata U
U Tokyo
JAEA
Inst for Nucl Res, Kiev
Ioffe Inst
TRINITI
Chonbuk Natl U
NFRI
KAIST
POSTECH
Seoul Natl U
ASIPP
CIEMAT
FOM Inst DIFFER
ENEA, Frascati
CEA, Cadarache
IPP, Jülich
IPP, Garching
ASCR, Czech Rep

UCLA supported FY2014 – 2017 to investigate CAE/GAE role in NSTX-U core energy transport

- Two independent tasks in parallel over four years:
  - (1) Advance CAE/GAE predictive capability ⇒ experimental validation of HYM physics model + prioritization of HYM development
  - (2) Improve physics understanding of transport mechanism ⇒ experimental test of hypotheses:
    - (a) resonant orbit interaction & (b) energy channeling via coupling to KAWs
- Supports 1/3 PI & UCLA Grad. for last 3 years
- In FY2014, exploit NSTX data (good data set in 2010)
  - Comparison with HYM simulation
    - synthetic diagnostic development: BES, reflectometry, interferometry
  - Model energy transport w/mode measurements & compare w/experiment
- In FY2014, prepare for NSTX-U experiments:
  - Model GAE/CAE NSTX-U activity – HYM + TRANSP Scenarios
  - Model energy transport

Research needs and plans for FY2015 & beyond

- Starting FY2015: investigate pitch angle dependence of CAEs/GAEs using new beams
- Each year: investigate parameter dependence in new regimes as B_T & I_P increases in stages
- Improved MHz measurement capability desirable
  - core access
    - continued improvement of BES (e.g. signal-to-noise)
    - core reflectometry in high performance (i.e. high density) plasmas
  - internal magnetic fluctuations
    - Polarimetry
    - Local measurements?
  - other internal MHz fluctuation diagnostics?
- Need NSTX-U support for Elena Belova & HYM development

To enhance student participation in NSTX-U research, solicitations should encourage educational component

- FES-related DOE solicitations (e.g. 2013 NSTX-U Collaboration Solicitation) do not explicitly encourage student research
  - In contrast, NSF-DOE Basic Plasma Science solicitations do explicitly encourage support for education – important criterion in proposal review
- Increased education emphasis in solicitations would encourage U.S. student (and University) participation in NSTX-U program
  - Industry respondents would NOT be excluded since they can support student research in partnership with Universities
  - would be effective even if less emphatic than NSF – as long as proposal review gives weight to education support